

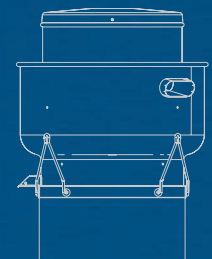
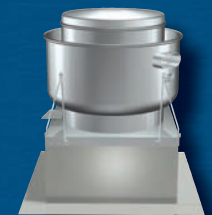
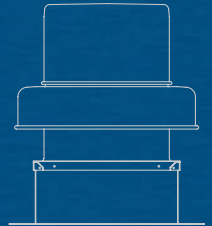
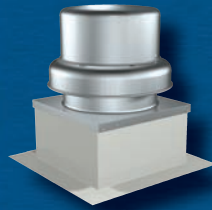
High Wind and Hurricane Zone Fans Models H-G, H-GB, H-CUE and H-CUBE Belt and Direct Drive Exhaust Fans

The Hurricane season has brought a new level of attention to wind resistance in the HVAC Industry. As you know, 2005 ended the worst hurricane season in history. With this increased level of awareness, comes a greater need for high wind resistant roof mounted equipment. To prevent water infiltration and building damage, it is critical that roof top equipment stay affixed to the roof. But how do you know which product can withstand high winds? Turn to Greenheck Models H-G, H-GB, H-CUE and H-CUBE to ensure your exhaust fans stay affixed to the roof.

Hurricane winds start at 75 mph. At speeds of 150 mph, wind can exert a 61 pound per square foot pressure or over 750 pounds of force on a fan and curb. Forceful winds were the cause of most hurricane damage, exceeding \$124 billion dollars in damage in 2005.

- *Greenheck is leading the Hurricane Standards development*
- *Models H-G, H-GB, H-CUE and H-CUBE are third-party tested*
- *Finite Element Analysis (FEA) done by licensed Professional Engineer (including P.E. in Florida, Texas, Louisiana...)*
- *Full scale wind tunnel tested to 150 MPH*
- *Tested as an assembly*
- *No tie downs to roof are required*

Severe weather calls for serious protection. We have the solution. Greenheck Models H-G, H-GB, H-CUE and H-CUBE. Remember that these are the only tested and proven high wind resistant fans. Don't sacrifice quality and durability—specify the only fans that will survive hurricane force winds.

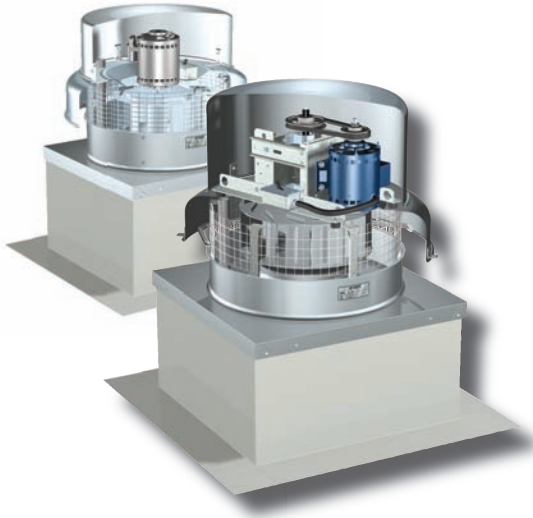


High Wind and Hurricane Zone Fans

Withstands winds up to 150 MPH



The Greenheck Models H-G and H-GB are downblast roof exhaust fans. Applications include general clean air and light moisture exhaust. The downblast design is ideal for all applications where air is discharged directly onto the roof surface. Models H-G and H-GB have been specifically designed for high wind and extreme weather applications. Structural bracing on the interior of the fan, tabbed and riveted curb cap corners, and high strength materials provide the added strength required to withstand winds of up to 150 MPH. Standard with a 12 inch (305 mm) tall H-GPF curb, no tie downs to the roof are required. (Other curb options are available.)



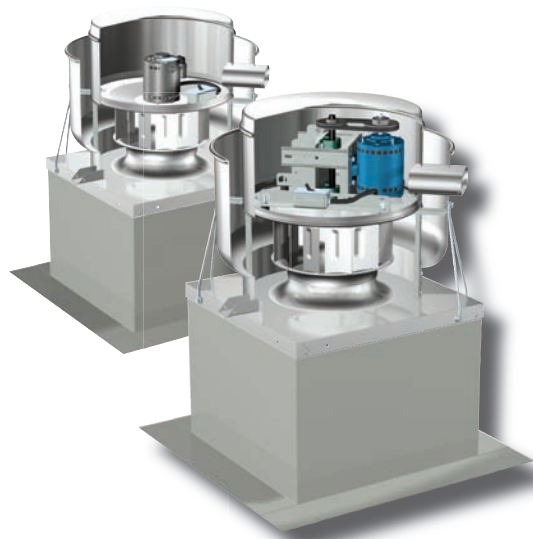
Performance: For full performance listings refer to the H-G and H-GB Catalog.

- Air performance up to 14,000 CFM (24,000 m³/hr).
- Pressure range from 0-2.75 inches wg (0-700 Pa).
- All fan sizes are tested in our AMCA Accredited Laboratory, and all models are licensed to bear the AMCA sound and air performance seal.

Standard Construction

- **Internal Bracing** - High strength internal support structure and bracing.
- **Shroud** - Heavy gauge reinforced drawn shroud with integral rolled bead for consistent material thickness and strength.
- **Drive Assembly** - Motor and drive frame are isolated from the airstream and mounted on true vibration isolators, and sized for 150% of maximum driven horsepower. (No steel to steel contact)
- **Bearings** - Pillow block design selected for a minimum average L10 life in excess of 100,000 hours (L50 life of 500,000 hours) at maximum cataloged speed.
- **Disconnect** - NEMA-1 disconnect is mounted and wired from the factory.

The Greenheck Models H-CUE and H-CUBE are upblast roof exhaust fans. Applications include restaurant exhaust and mild contaminants. The upblast design is ideal for all applications where it is important to discharge air away from the roof surface. Models H-CUE and H-CUBE have been specifically designed for high wind and extreme weather applications. Structural bracing on the interior and exterior of the fan, tabbed and riveted curb cap corners, and high strength materials provide the added strength required to withstand winds of up to 150 MPH. Standard with a 12 inch (305 mm) tall H-GPF curb, no tie downs to the roof are required. (Other curb options are available.)



Performance: For full performance listings refer to the H-CUE and H-CUBE Catalog.

- Air performance up to 14,700 CFM (25,000 m³/hr).
- Pressure range from 0-5 inches wg (0-1,250 Pa).
- All fan sizes are tested in our AMCA Accredited Laboratory, and all models are licensed to bear the AMCA sound and air performance seal.

Standard Construction

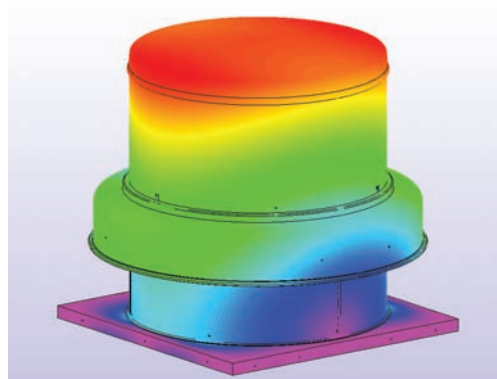
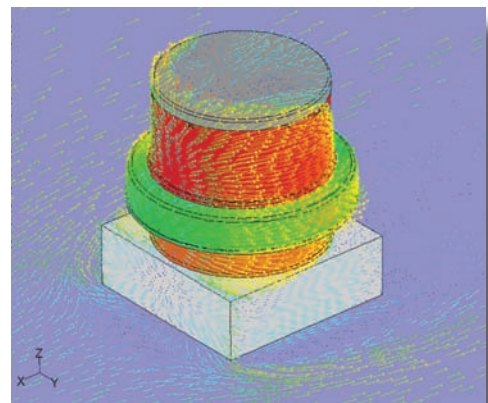
- **Internal Bracing** - Additional high strength internal bracing structure.
- **External Bracing** - Integral high strength mounted external bracing.
- **Windband** - Heavy gauge one piece windband with integral rolled bead, 100% welded to an aluminum curb cap.
- **Drive Assembly** - Motor and drive frame are isolated from the airstream and mounted on true vibration isolators, and sized for 150% of maximum driven horsepower.
- **Bearings** - Bearings are pillow block design selected for a minimum average L10 life in excess of 100,000 hours (L50 life of 500,000 hours) at maximum cataloged speed.
- **Disconnect** - NEMA-1 disconnect is mounted and wired from the factory.
- **Curb Cap** - Heavy gauge with pre-punched mounting holes.

High Wind and Hurricane Zone Fans

Third Party Testing and Certifications

The Greenheck high wind models have been thoroughly tested in accordance with recognized standards. With the H-G, H-GB, H-CUE and the H-CUBE you are not only getting a superior product built by a quality company, you are getting the assurance through a number of third party certifications that the fan is capable of withstanding high winds.

- **State P.E. Calculations:** Models have been reviewed by state licensed professional engineers to ensure that they conform to the requirements of ASCE 7-02 Minimum Design Loads for Buildings and Other Structures, International Building Code and the Florida Building Code.
- **Test Protocols:** Models have been subjected to an extensive testing regime. The models have been tested in accordance with ASTM E330 standards at design pressures that correspond to over 150 MPH wind loads.
- **Computational Fluid Dynamics (CFD):** Greenheck leads the industry with cutting edge technology. Computational Fluid Dynamics simulates the airflow of high speed (150 MPH) winds over the surface of fans. The software records the force profile that the wind exerts on the fan, which can be used to complete Finite Element Analysis of the stresses in each unit. Models have been completely analyzed utilizing CFD to prove superior strength and resistance to high winds.
- **Finite Element Analysis (FEA)** Utilizing the results from CFD analysis Greenheck can accurately predict the stress, strain, and deflection that result from high wind loads. A complete FEA utilizing CFD results is used to verify the fans capabilities and prove the results of professional engineer calculations.



When high wind forces are a concern, turn to Greenheck's high wind models. Models H-G and H-GB downblast roof exhaust fans and H-CUE and H-CUBE upblast restaurant exhaust fans are the only fans tested and certified to withstand high winds. Don't sacrifice quality and durability—specify the only fans that will survive hurricane force winds, Greenheck models H-G, H-GB, H-CUE and H-CUBE.

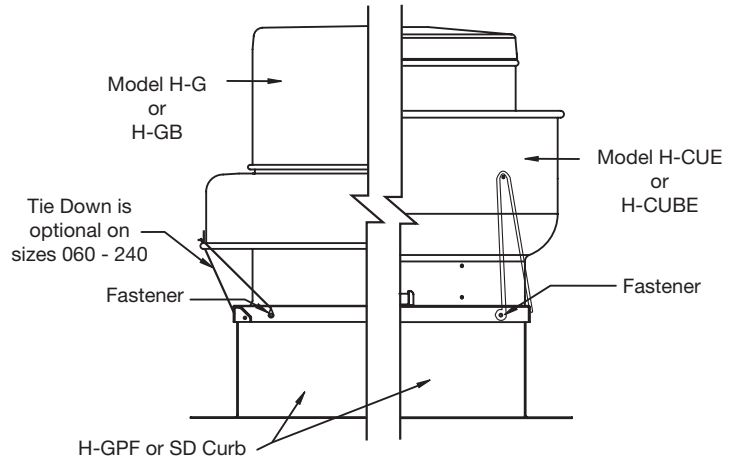
Typical Installation

Fan to Curb Mounting

H-G Size	H-GB Size	Fasteners Per Side	Total Fasteners
060 - 141	098 - 161	3	12
150 - 180	180 - 300	5	20

Fan to curb tie down is not required to meet 150 MPH wind loads for size 240 and smaller.

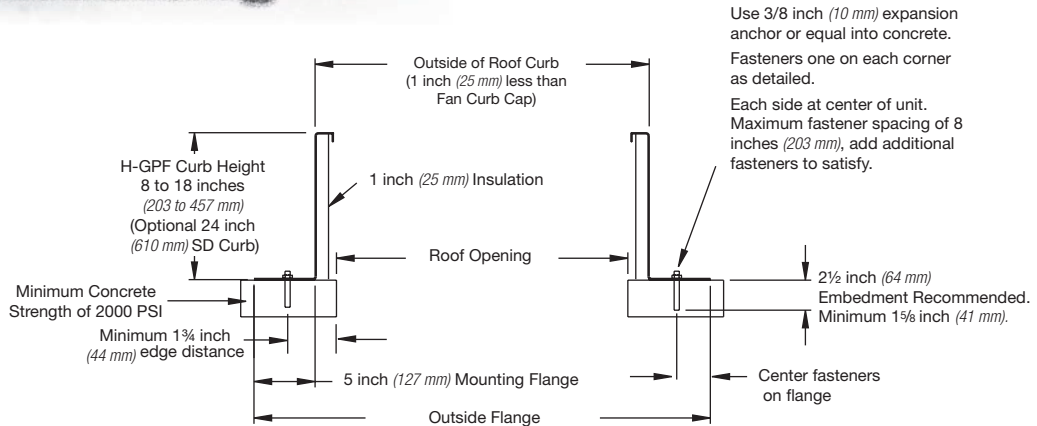
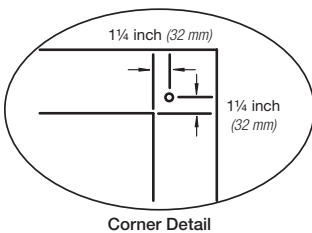
H-CUE Size	H-CUBE Size	Fasteners Per Side	Total Fasteners
060 - 161	098 - 161	3	12
180 - 200	180 - 240	5	20
-	300	9	36



Fasteners on each side of the fan are to be installed with one fastener 4 inches (102 mm) from each edge and one fastener centered. The remaining fasteners are to be equally spaced.

Typical Installation

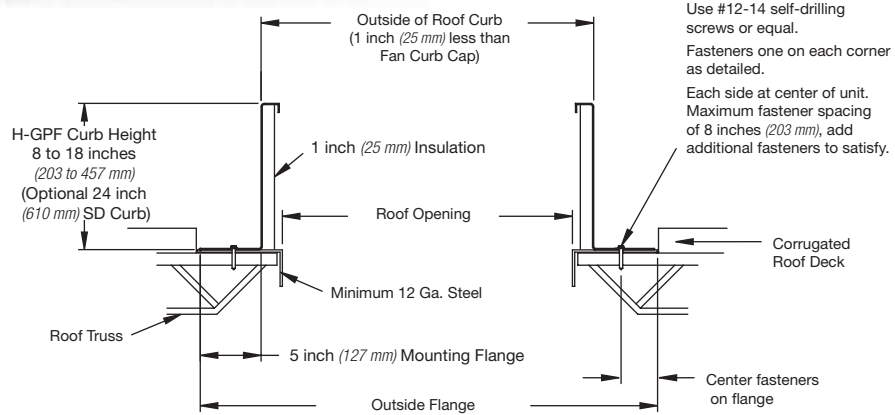
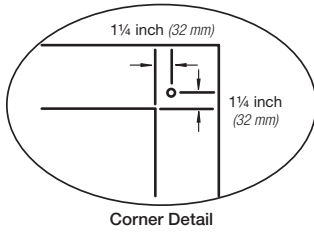
Concrete Deck Anchoring



H-G Size	H-GB Size	H-CUE Size	H-CUBE Size	Fan Curb Cap	Roof Opening	Fasteners Per Side	Outside Flange
060 - 075	-	060 - 075	-	17 x 17 (432 x 432)	10 1/2 x 10 1/2 (267 x 267)	5	26 x 26 (660 x 660)
080 - 095	-	-	-	17 x 17 (432 x 432)	12 1/2 x 12 1/2 (318 x 318)	5	26 x 26 (660 x 660)
-	-	080 - 095	-	19 x 19 (483 x 483)	12 1/2 x 12 1/2 (318 x 318)	5	28 x 28 (711 x 711)
101 - 121	071 - 131	098 - 131	098 - 131	19 x 19 (483 x 483)	14 1/2 x 14 1/2 (368 x 368)	5	28 x 28 (711 x 711)
131 - 141	141 - 161	141 - 161	141 - 161	22 x 22 (559 x 559)	18 1/2 x 18 1/2 (470 x 470)	5	31 x 31 (787 x 787)
150	-	-	-	26 x 26 (660 x 660)	18 1/2 x 18 1/2 (470 x 470)	5	35 x 35 (889 x 889)
160 - 180	180 - 200	180 - 200	180 - 200	30 x 30 (762 x 762)	20 1/2 x 20 1/2 (521 x 521)	7	39 x 39 (991 x 991)
-	220 - 240	-	220 - 240	34 x 34 (864 x 864)	26 1/2 x 26 1/2 (673 x 673)	7	43 x 43 (1092 x 1092)
-	260 - 300	-	300	40 x 40 (1016 x 1016)	32 1/2 x 32 1/2 (826 x 826)	7	49 x 49 (1245 x 1245)

Typical Installation

Metal Building/Steel Deck Anchoring

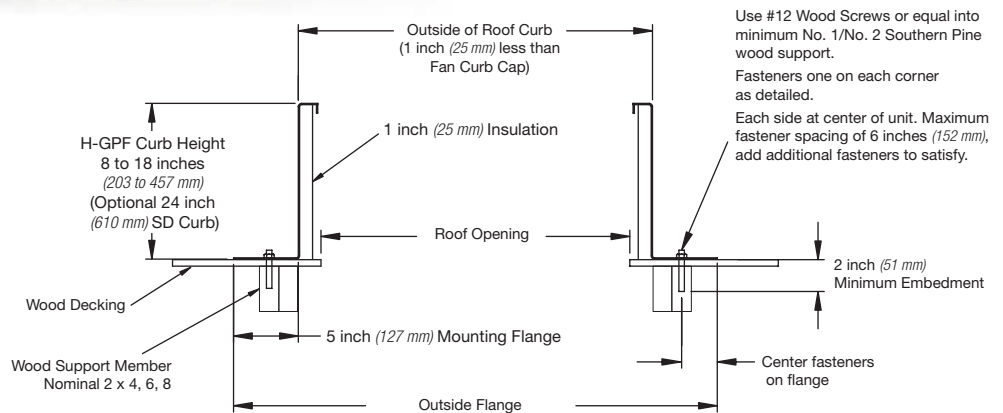
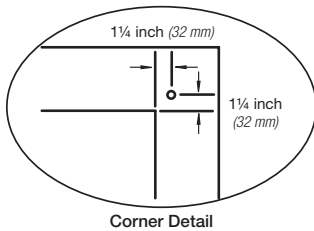


H-G Size	H-GB Size	H-CUE Size	H-CUBE Size	Fan Curb Cap	Roof Opening	Fasteners Per Side	Outside Flange
060 - 075	-	060 - 075	-	17 x 17 (432 x 432)	10½ x 10½ (267 x 267)	5	26 x 26 (660 x 660)
080 - 095	-	-	-	17 x 17 (432 x 432)	12½ x 12½ (318 x 318)	5	26 x 26 (660 x 660)
-	-	080 - 095	-	19 x 19 (483 x 483)	12½ x 12½ (318 x 318)	5	28 x 28 (711 x 711)
101 - 121	071 - 131	098 - 131	098 - 131	19 x 19 (483 x 483)	14½ x 14½ (368 x 368)	5	28 x 28 (711 x 711)
131 - 141	141 - 161	141 - 161	141 - 161	22 x 22 (559 x 559)	18½ x 18½ (470 x 470)	5	31 x 31 (787 x 787)
150	-	-	-	26 x 26 (660 x 660)	18½ x 18½ (470 x 470)	5	35 x 35 (889 x 889)
160 - 180	180 - 200	180 - 200	180 - 200	30 x 30 (762 x 762)	20½ x 20½ (521 x 521)	7	39 x 39 (991 x 991)
-	220 - 240	-	220 - 240	34 x 34 (864 x 864)	26½ x 26½ (673 x 673)	7	43 x 43 (1092 x 1092)
-	260 - 300	-	300	40 x 40 (1016 x 1016)	32½ x 32½ (826 x 826)	7	49 x 49 (1245 x 1245)

All dimensions in inches (millimeters).

Typical Installation

Wood Deck Anchoring



H-G Size	H-GB Size	H-CUE Size	H-CUBE Size	Fan Curb Cap	Roof Opening	Fasteners Per Side	Outside Flange
060 - 075	-	060 - 075	-	17 x 17 (432 x 432)	10½ x 10½ (267 x 267)	5	26 x 26 (660 x 660)
080 - 095	-	-	-	17 x 17 (432 x 432)	12½ x 12½ (318 x 318)	5	26 x 26 (660 x 660)
-	-	080 - 095	-	19 x 19 (483 x 483)	12½ x 12½ (318 x 318)	5	28 x 28 (711 x 711)
101 - 121	071 - 131	098 - 131	098 - 131	19 x 19 (483 x 483)	14½ x 14½ (368 x 368)	5	28 x 28 (711 x 711)
131 - 141	141 - 161	141 - 161	141 - 161	22 x 22 (559 x 559)	18½ x 18½ (470 x 470)	5	31 x 31 (787 x 787)
150	-	-	-	26 x 26 (660 x 660)	18½ x 18½ (470 x 470)	7	35 x 35 (889 x 889)
160 - 180	180 - 200	180 - 200	180 - 200	30 x 30 (762 x 762)	20½ x 20½ (521 x 521)	7	39 x 39 (991 x 991)
-	220 - 240	-	220 - 240	34 x 34 (864 x 864)	26½ x 26½ (673 x 673)	7	43 x 43 (1092 x 1092)
-	260 - 300	-	300	40 x 40 (1016 x 1016)	32½ x 32½ (826 x 826)	9	49 x 49 (1245 x 1245)

All dimensions in inches (millimeters).

Specifications

Centrifugal Downblast Roof Exhaust Fans

H-G — Direct Drive

Model H-G spun aluminum exhaust fans shall be centrifugal direct driven type. The fan wheel shall be centrifugal backward inclined, constructed of aluminum and shall include a wheel cone carefully matched to the inlet cone for precise running tolerances. Wheels shall be statically and dynamically balanced. The fan housing shall be drawn from high strength aluminum and connected to a heavy gauge steel internal frame with integral bracing and a birdscreen.

Motors shall be heavy duty ball bearing type, carefully matched to the fan load, and furnished mounted to the steel drive assembly at the specified voltage, phase, and enclosure. Motors or drive assembly shall be mounted on vibration isolators. Fresh air for motor cooling shall be drawn into the motor compartment through a large space between the fan shroud and motor cover. Motors shall be readily accessible for maintenance.

A disconnect shall be NEMA rated and factory installed with wiring included from the fan motor to a junction box installed within the motor compartment. A conduit chase shall be provided through the base to the motor compartment for ease of electrical wiring.

All fans shall bear the AMCA Certified Ratings Seal for sound and air performance.

Each fan shall bear a permanently affixed manufacturer's engraved nameplate constructed of aluminum and containing the model number and individual serial number for future identification.

Fans shall meet all Greenheck wind load standards and shall contain the following third party certifications.

- *Licensed P.E. calculations shall be available for fan per ASCE 7-02 Minimum Design Loads for Buildings and Other Structures for exposure class C, 60 foot building height, and a type II building.*
- *Fan shall be tested in accordance with ASTM E330-02. Structural Performance of Exterior Windows, Doors, Skylights, and Curtain Walls by Uniform Static Air Pressure Difference at the ASCE 7-02 calculated design load.*
- *Licensed P.E. calculations for attachment of fan to curb shall be available for ASCE 7-02 determined design pressure.*
- *All calculations and testing shall be done by a state licensed P.E., and a certified test lab.*

Fans shall be Greenheck model H-G manufactured by Greenheck Fan Corporation in Schofield Wisconsin.

H-GB — Belt Drive

Model H-GB spun aluminum exhaust fans shall be centrifugal belt driven type. The fan wheel shall be centrifugal backward inclined, constructed of aluminum and shall include a wheel cone carefully matched to the inlet cone for precise running tolerances. Wheels shall be statically and dynamically balanced. The fan housing shall be drawn from high strength aluminum and connected to a heavy gauge steel internal frame with integral bracing and a birdscreen.

Motors shall be heavy-duty ball bearing type, carefully matched to the fan load, and furnished mounted to the steel drive frame at the specified voltage, phase, and enclosure. Drive frame assembly shall be constructed of heavy gauge steel with engineered forms for added strength. Motors and drives shall be mounted on vibration isolators with no metal to metal contact, out of the airstream. Fresh air for motor cooling shall be drawn into the motor compartment through a large space between the fan shroud and the motor cover. Motors and drives shall be readily accessible for maintenance.

Precision ground and polished fan shafts shall be mounted in pillow block ball bearings. Bearings shall be selected for a minimum (L10) life in excess of 100,000 hours (L50 average of 500,000 hrs) at maximum cataloged operating speed. Drives shall be sized for a minimum of 150% of driven horsepower. Pulleys shall be of the cast type, keyed and securely attached to the wheel and motor shafts.

Motor pulleys shall be adjustable for final system balancing. A disconnect switch shall be NEMA rated and factory installed with wiring included from the fan motor to a junction box installed within the motor compartment. A conduit chase shall be provided through the base to the motor compartment for ease of electrical wiring.

All fans shall bear the AMCA Certified Ratings Seal for sound and air performance.

Each fan shall bear a permanently affixed manufacturer's engraved metal nameplate containing the model number and individual serial number for future identification.

Fans shall meet all Greenheck wind load standards and shall contain the following third party certifications.

- *Licensed P.E. calculations shall be available for fan per ASCE 7-02 Minimum Design Loads for Buildings and Other Structures for exposure class C, 60 foot building height, and a type II building.*
- *Fan shall be tested in accordance with ASTM E330-02. Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference at the ASCE 7-02 calculated design pressure.*
- *Licensed P.E. calculations for attachment of fan to curb shall be available for ASCE 7-02 determined design pressure.*
- *All calculations and testing shall be done by a state licensed P.E., and a certified test lab.*

Fans shall be Greenheck models H-GB and H-GB-HP, manufactured by Greenheck Fan Corporation in Schofield, Wisconsin.

Specifications

Centrifugal Upblast Roof Exhaust Fans

H-CUE — Direct Drive

Model H-CUE spun aluminum exhaust fans shall be centrifugal direct driven type. The fan wheel shall be backward inclined, constructed of aluminum and shall include a wheel cone carefully matched to the inlet venturi for precise running tolerances. Wheels shall be statically and dynamically balanced. The fan housing shall be uniquely spun from a cylinder of heavy gauge aluminum and mounted to a high strength steel frame. The windband shall be one piece and 100% continuously robotically welded to the one piece aluminum curb cap. High wind load braces shall connect the curb cap to the windband.

Motors shall be heavy duty ball bearing type, carefully matched to the fan load, and furnished mounted to the steel drive assembly at the specified voltage, phase, and enclosure. Motors or drive assembly shall be mounted on vibration isolators. Fresh air for motor cooling shall be drawn into the motor compartment through a breather tube free of discharge contaminants. Motors shall be readily accessible for maintenance.

A disconnect shall be NEMA rated and factory installed with wiring included from the fan motor to a junction box installed within the motor compartment. A conduit chase shall be provided through the base to the motor compartment for ease of electrical wiring.

All fans shall bear the AMCA Certified Ratings Seal for sound and air performance.

Each fan shall bear a permanently affixed manufacturer's engraved nameplate constructed of aluminum and containing the model number and individual serial number for future identification.

Fans shall meet all Greenheck wind load standards and shall contain the following third party certifications:

- *Licensed P.E. calculations shall be available for fan per ASCE 7-02 Minimum Design Loads for Buildings and Other Structures for exposure class C, 60 foot building height, and a type II building.*
- *Fan shall be tested in accordance with ASTM E330-02. Structural Performance of Exterior Windows, Doors, Skylights, and Curtain Walls by Uniform Static Air Pressure Difference at the ASCE 7-02 calculated design load.*
- *Licensed P.E. calculations for attachment of fan to curb shall be available for ASCE 7-02 determined design pressure.*
- *All calculations and testing shall be done by a state licensed P.E., and a certified test lab.*

Fans shall be Greenheck models H-CUE or H-CUE-HP manufactured by Greenheck Fan Corporation in Schofield, Wisconsin.

H-CUBE — Belt Drive

Model H-CUBE spun aluminum exhaust fans shall be centrifugal belt driven type. The fan wheel shall be centrifugal backward inclined, constructed of aluminum and shall include a wheel cone carefully matched to the inlet cone for precise running tolerances. Wheels shall be statically and dynamically balanced. The fan housing shall be uniquely spun from a cylinder of heavy gauge aluminum and mounted to a high strength steel frame. The windband shall be 100% continuously robotically welded to the one-piece aluminum curb cap. High wind load braces shall connect the curb cap to the windband.

Motors shall be heavy-duty ball bearing type, carefully matched to the fan load, and furnished mounted to the steel drive frame at the specified voltage, phase, and enclosure. Drive frame assembly shall be constructed of heavy gauge steel with engineered forms for added strength. Motors and drives shall be mounted on vibration isolators with no metal to metal contact, out of the airstream. Fresh air for motor cooling shall be drawn into the motor compartment through a ten square inch breather tube free of discharge contaminants. Motors and drives shall be readily accessible for maintenance.

Precision ground and polished fan shafts shall be mounted in pillow block ball bearings. Bearings shall be selected for a minimum (L10) life in excess of 100,000 hours (L50 average of 500,000 hrs) at maximum cataloged operating speed. Drives shall be sized for a minimum of 150% of driven horsepower. Pulleys shall be of the cast type, keyed and securely attached to the wheel and motor shafts.

Motor pulleys shall be adjustable for final system balancing. A disconnect switch shall be NEMA rated and factory installed with wiring included from the fan motor to a junction box installed within the motor compartment. A conduit chase shall be provided through the base to the motor compartment for ease of electrical wiring.

All fans shall bear the AMCA Certified Ratings Seal for sound and air performance.

Each fan shall bear a permanently affixed manufacturer's engraved metal nameplate containing the model number and individual serial number for future identification.

Fans shall meet all Greenheck wind load standards and shall contain the following third party certifications.

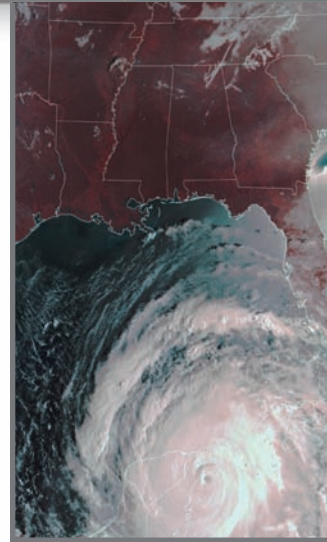
- *Licensed P.E. calculations shall be available for fan per ASCE 7-02 Minimum Design Loads for Buildings and Other Structures for exposure class C, 60 foot building height, and a type II building.*
- *Fan shall be tested in accordance with ASTM E330-02. Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Pressure Difference, at the ASCE 7-02 calculated design pressure.*
- *Licensed P.E. calculations for attachment of fan to curb shall be available for ASCE 7-02 determined design pressure.*
- *All calculations and testing shall be done by a state licensed P.E., and a certified test lab.*

Fans shall be Greenheck models H-CUBE, H-CUBE-HP and H-CUBE-XP manufactured by Greenheck Fan Corporation in Schofield, Wisconsin.

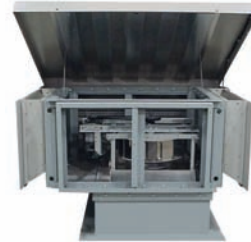
Severe Duty Products



Model USGF is a leader in severe wind and severe grease applications. The USGF has been subjected to Miami-Dade test protocols TAS-201/202/203 for wind pressure and missile impact. After extensive testing exceeding all standards the USGF was still in operating condition. The USGF is UL/cUL listed for restaurant exhaust with continuous operation at 400°F. The unit is constructed entirely of steel and includes a non-stick coated steel wheel, NEMA-3R disconnect, hinged base assembly, and clean out port. Making the USGF ideal in high wind applications. Performance is AMCA certified to 7,000 cfm and up to 3 inches wg.



Models LDP/LBP are the only rooftop exhaust fan that can withstand design pressures in excess of 140 PSF. The LDP/LBP with SDLE enclosure passes all Miami-Dade and Florida Building Code requirements (TAS-201/202/203). The severe duty LDP/LBP is constructed of Miami-Dade approved louvers (model ESD-603D) with a high strength structural steel support frame, and ships mounted to a 12 gauge steel curb. For applications requiring missile impact resistance turn to the Greenheck severe duty LDP/LBP for all your exhausting needs. Performance on these units is AMCA certified and ranges from 100 up to 14,200 cfm and up to 1.25 inches wg.



Model RSFP is the only rooftop centrifugal supply fan that can withstand design pressures in excess of 140 PSF. The RSFP with SDLE enclosure passes all Miami-Dade and Florida Building Code requirements (TAS-201/202/203). The severe duty RSFP is constructed of Miami-Dade approved louvers (model ESD-603D) with a high strength structural steel support frame, and ships mounted to a 12 gauge steel curb. For untempered supply applications with missile impact resistance turn to the Greenheck severe duty RSFP. Performance on these units is AMCA certified and ranges from 650 up to 14,300 cfm and up to 2 inches wg.

The Severe Duty Louver line is the most diverse in the industry. We were first to offer a Miami-Dade qualified Severe Duty Louvered Enclosure (model SDLE) and offer three Miami-Dade qualified louver models as well. With the ability to complete Large Missile Impact and Wind-Driven Rain Testing in-house, we continue to accelerate our product development and remain an industry leader.



The Vektor product line is used in applications requiring dilution of exhaust air or high plume rise above the roof line. Common applications include laboratory exhaust, odor control and kitchen exhaust. Vektor models are AMCA certified and UL/cUL listed. Fan systems are rated to withstand 125 MPH wind loading without the use of guy wires. Vektor product line meets NFPA, ANSI Z9.7, and ASHRAE code requirements and guidelines for laboratory exhaust systems.

Whether your application calls for meeting a high wind load, impact resistance, or resistance to the penetration of wind-driven rain, Greenheck has the solution.

